

75. (New) An assay cassette having one or more wells, said cassette comprising a plurality of holes in a mask sealed against a plurality of individual working electrodes on a support thereby forming said one or more wells, wherein each well contains at least one working electrode having at least two binding domains and said binding domains are hydrophilic or hydrophobic with respect to a surrounding surface adjacent said binding domains.

76. (New) The assay cassette of claim 75, wherein said surrounding surface is hydrophobic and said binding domains are hydrophilic.

77. (New) The assay cassette of claim 75, wherein said surrounding surface is hydrophilic and said binding domains are hydrophobic.

78. (New) The assay cassette of claim 75, wherein light may be detected through said support.

79. (New) The assay cassette of claim 75, wherein at least a portion of said support is transparent.

80. (New) The assay cassette of claim 75, wherein said assay cassette is a multi-well plate.

81. (New) The assay cassette of claim 75, wherein said binding domains are located at the bottom of said wells.

82. (New) The assay cassette of claim 75, wherein said assay cassette is a 96 well or 386 well plate.

83. (New) The assay cassette of claim 75, further comprising reagents for conducting assays.

84. (New) The assay cassette of claim 83, wherein said reagents are stored in a dry state.

85. (New) The assay cassette of claim 83, wherein said reagents are stored in a wet state.

86. (New) The assay cassette of claim 83, wherein said reagents are immobilized on said binding domains.

87. (New) The assay cassette of claim 83, wherein said reagents are immobilized on said binding domains via covalent chemical bonds, non-specific adsorption, electrostatic interactions, hydrophobic interaction, hydrophilic interaction, confinement or entrainment in liquids or gels, biospecific binding, metal/ligand bonds, chelation or entanglement in polymers.

88. (New) The assay cassette of claim 83, wherein said reagents are selected from the group consisting of: receptors, ligands for receptors, antibodies or binding portions thereof, proteins or fragments thereof, nucleic acids, oligonucleotides, glycoproteins, polysaccharides, antigens, epitopes, cells and cellular components, subcellular particles, carbohydrate moieties, enzymes, enzyme substrates, lectins, protein A, protein G, viruses, prions, viroids, lipids, fatty acids, lipopolysaccharides, peptides, cellular metabolites, hormones, pharmacological agents, tranquilizers, barbiturates, alkaloids, steroids, vitamins, amino acids, sugars, nonbiological polymers, biotin, avidin, streptavidin, lipoproteins, cytokines, lymphokines, hormones, synthetic polymers, organic and inorganic molecules.

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89. (New) The assay cassette of claim 83, wherein said reagents are selected from the group consisting of: antibodies or binding portions thereof, proteins or fragments thereof, nucleic acids, and antigens.

90. (New) The assay cassette of claim 75, further comprising an electrochemiluminescent label.

91. (New) The assay cassette of claim 75, further comprising an electrochemiluminescent label comprising a metal-containing organic compound, wherein the metal is selected from the group consisting of ruthenium, osmium, rhenium, iridium, rhodium, platinum, palladium, molybdenum, technetium and tungsten.

92. (New) The assay cassette of claim 75, further comprising an electrochemiluminescent label comprising a Ru- or Os-containing organic compound

93. (New) The assay cassette of claim 75, wherein said individual working electrodes are from 0.001 to 10 mm in width or diameter.

94. (New) The assay cassette of claim 75, wherein said individual working electrodes are from 0.01 to 1 mm in width or diameter.

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95. (New) The assay cassette of claim 75, wherein said working electrodes comprise carbon.

96. (New) The assay cassette of claim 75, wherein said working electrodes comprise particulate carbon, carbon black, carbon felts, glassy carbon, carbon fibers, carbon fibrils or combinations thereof.

97. (New) The assay cassette of claim 75, wherein said working electrodes comprise a composite material.

98. (New) The assay cassette of claim 75, wherein said working electrodes comprise a composite material including a polymeric material and carbon particles.

99. (New) The assay cassette of claim 75, wherein said working electrodes include separately addressable electrodes.

100. (New) The assay cassette of claim 75, further comprising at least one counter electrode.

101. (New) The assay cassette of claim 75, further comprising electrical contacts electrically connected to said working electrodes.

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102. (New) The assay cassette of claim 101, wherein said electrical contacts are located proximate the edge of said first support.

103. (New) A kit comprising, in one or more containers, the assay cassette of claim 75 and one or more reagents.

104. (New) The kit of claim 103, wherein said one or more reagents comprise an electrochemiluminescent label.

105. (New) The kit of claim 103, wherein said one or more reagents comprise an electrochemiluminescent label comprising a metal-containing organic compound, wherein the metal is selected from the group consisting of ruthenium, osmium, rhenium, iridium, rhodium, platinum, palladium, molybdenum, technetium and tungsten.

106. (New) The kit of claim 103, wherein said one or more reagents comprise an electrochemiluminescent label comprising a Ru- or Os-containing organic compound.

107. (New) An apparatus comprising a light detector and the assay cassette of claim 75.

108. (New) The apparatus of claim 107, further comprising electrical connectors capable of providing electrical energy to said working electrodes.

109. (New) The apparatus of claim 107, wherein said light detector is capable of scanning electrochemiluminescence signals emitted from said binding domains.

110. (New) A multi-well plate comprising a plurality of wells, wherein at least two of said wells have independently addressable electrodes centered at the bottom of said wells.

111. (New) The multi-well plate of claim 110, wherein said electrode surface comprises carbon.

112. (New) The multi-well plate of claim 110, further comprising a mask having a plurality of holes sealed against said electrodes.

113. (New) The multi-well plate of claim 110, wherein said electrodes comprise carbon.

114. (New) The multi-well plate of claim 110, wherein said electrodes comprise particulate carbon, carbon black, carbon felts, glassy carbon, carbon fibers, carbon fibrils or combinations thereof.

115. (New) The multi-well plate of claim 110, wherein said electrode surfaces comprise a composite material.

116. (New) The multi-well plate of claim 110, wherein said electrodes comprise a composite material including a polymeric material and carbon particles.

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117. (New) The multi-well plate of claim 110, wherein said electrodes are from 0.01 to 1 mm in width or diameter.

118. (New) The multi-well plate of claim 110, further comprising at least one counter electrode within each well.

119. (New) The multi-well plate of claim 110, further comprising electrical contacts electrically connected to said electrodes.

120. (New) A kit comprising, in one or more containers, the multi-well plate of claim 110 and one or more reagents.

121. (New) The kit of claim 120, wherein said one or more reagents comprise an electrochemiluminescent label.

122. (New) The kit of claim 120, wherein said one or more reagents comprise an electrochemiluminescent label comprising a metal-containing organic compound, wherein the metal is selected from the group consisting of ruthenium, osmium, rhenium, iridium, rhodium, platinum, palladium, molybdenum, technetium and tungsten.

123. (New) The kit of claim 120, wherein said one or more reagents comprise an electrochemiluminescent label comprising a Ru- or Os-containing organic compound.

124. (New) An apparatus comprising a light detector and the multi-well plate of claim 110.

125. (New) The apparatus of claim 124, further comprising electrical connectors capable of providing electrical energy to said working electrodes.

126. (New) The apparatus of claim 124, wherein said light detector is capable of scanning electrochemiluminescence signals emitted from said binding domains.

127. (New) An electrode comprising a mask having an array of holes thereon defining at least one exposed area of said electrode, wherein said electrode is adapted for use in electrochemiluminescence assays.

128. (New) An electrode comprising a mask having an array of holes thereon defining at least two exposed area of said electrode, wherein said electrode is adapted for use in electrochemiluminescence assays.

129. (New) The electrode of claim 127, wherein said electrode comprises a composite.

130. (New) The electrode of claim 127, wherein said at least one exposed area comprises a binding domain.

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131. (New) The electrode of claim 130, wherein said binding domain comprises one or more reagents.

132. (New) The electrode of claim 130, wherein said binding domain comprises an electrochemiluminescent label.

133. (New) The electrode of claim 132, wherein said electrochemiluminescent label comprises a metal-containing organic compound, wherein the metal is selected from the group consisting of ruthenium, osmium, rhenium, iridium, rhodium, platinum, palladium, molybdenum, technetium and tungsten.

134. (New) The electrode of claim 132, wherein said electrochemiluminescent label comprises a Ru- or Os-containing organic compound.